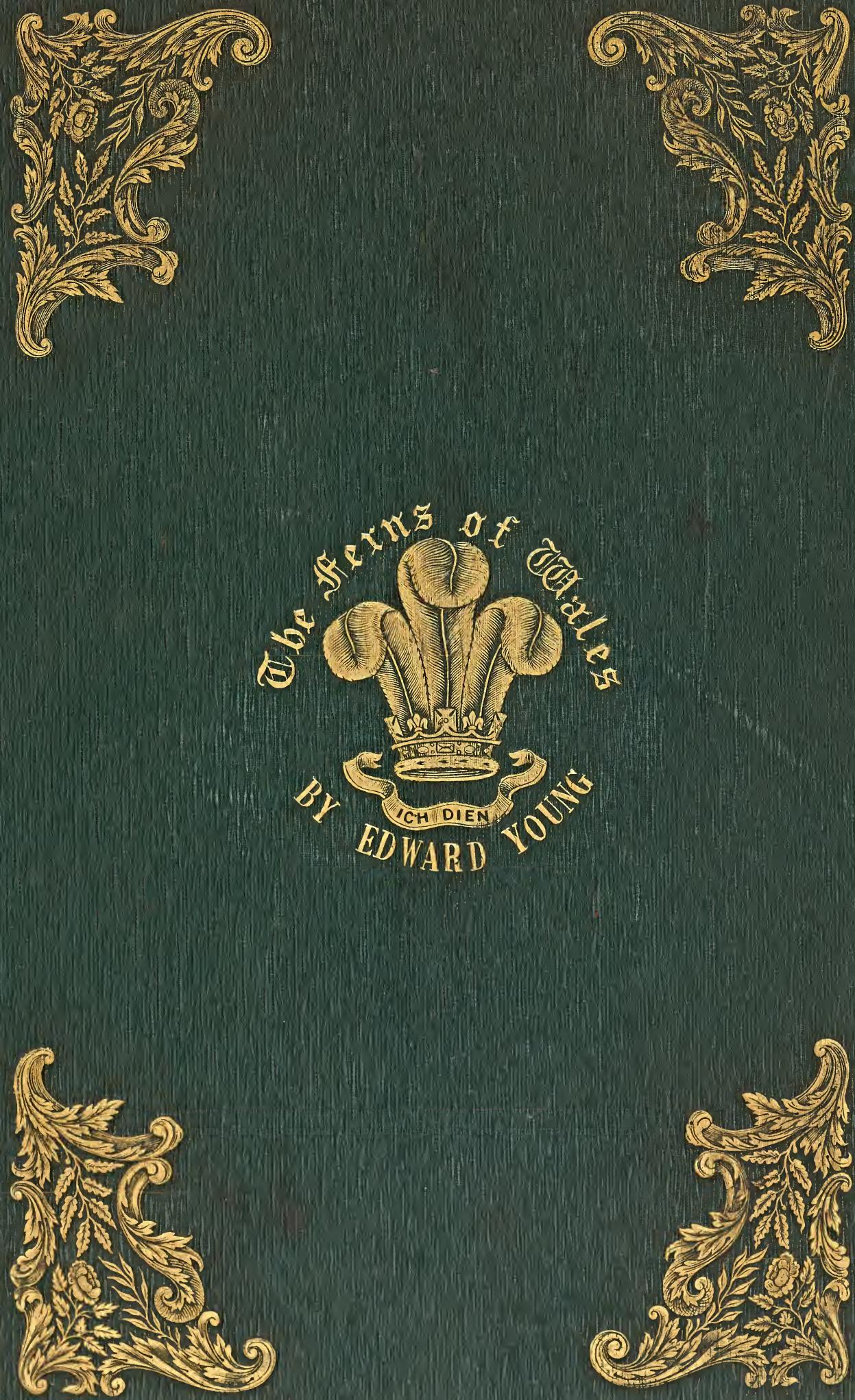
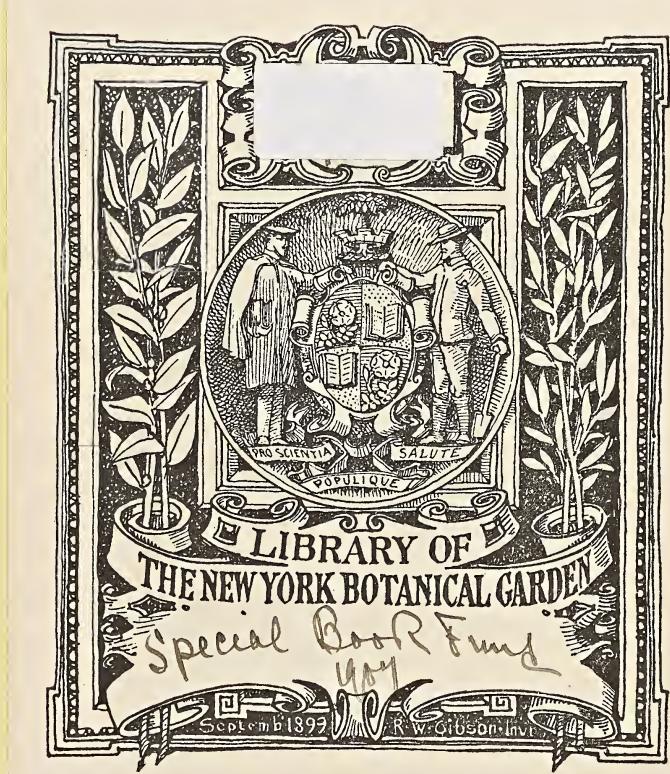


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The Heralds of Wales
BY EDWARD YOUNG
ICH DIEN



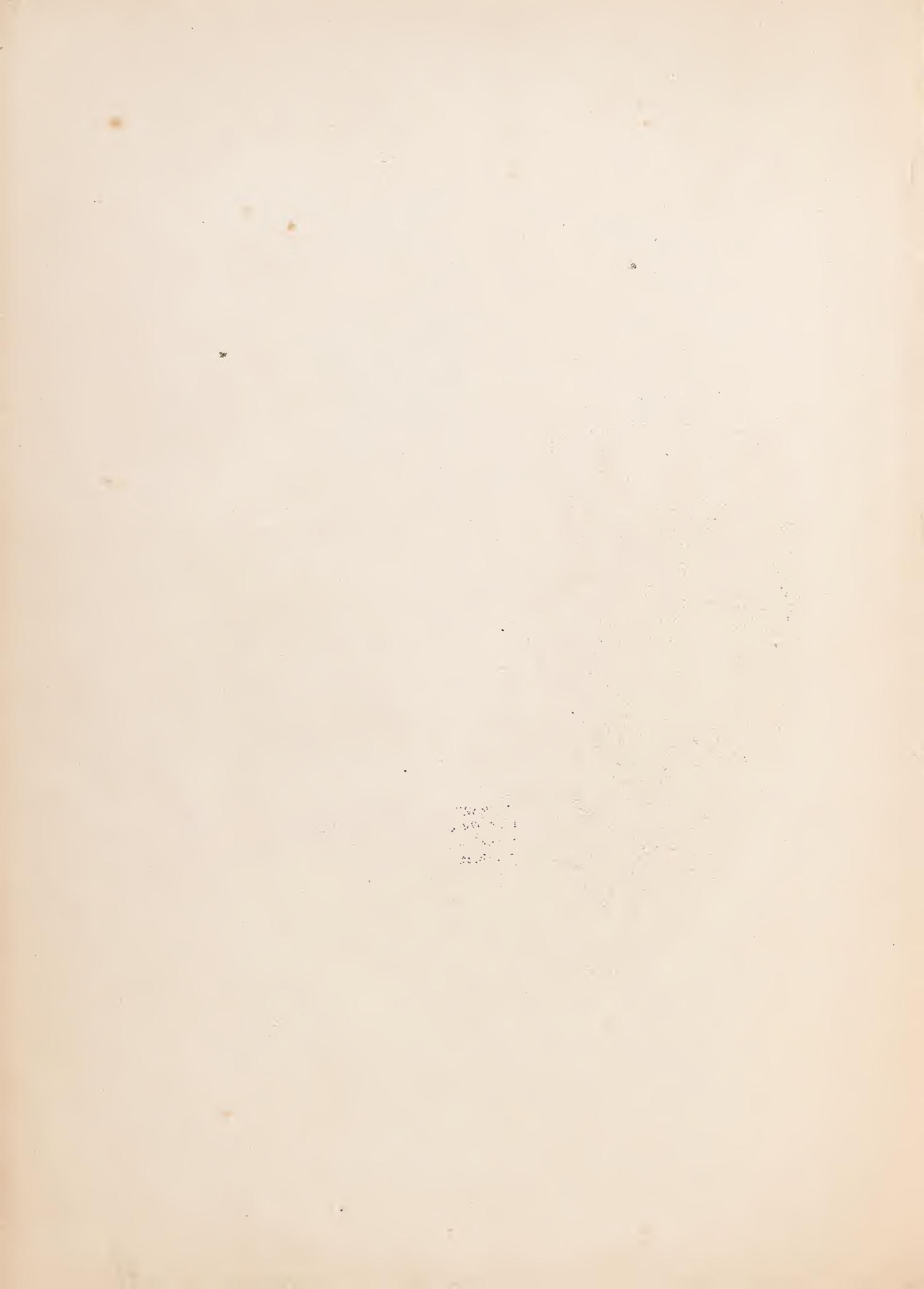




Melin Court Waterfall, Vale of Neath. From a Photograph by C. H. Waring

The Ferns of Wales, by Edw^d Young.

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THE

FERN S OF WALES.

BY

EDWARD YOUNG.

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Heath:

PRINTED AND PUBLISHED BY THOMAS THOMAS.

1856.

Introduction.

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IT is generally considered that there are forty species of ferns found in the British Isles ; of these thirty-four are met with in Wales. Of the remaining six, one (*Gymnogramma leptophylla*) is confined to the Channel Islands ; two are found only in Scotland, (*Cystopteris montana* and *Pseudathyrium alpestre*) ; two (*Aspidium cristatum* and *Aspidium rigidum*) are found in only two or three counties in the North of England ; and the remaining one (*Trichomanes speciosum*) only in Ireland.

From this it will be seen, that although the present Work illustrates the ferns of Wales in particular, yet that it embraces nearly every species found in Great Britain,—and all of those which are the most beautiful, and therefore most likely to be cultivated in the fernery.

Although the present Work gives what are generally called thirty-four species, yet several of these so nearly resemble one another as to render it difficult to decide whether they are not merely varieties : these will be pointed out in their places, and it will be seen that the differences are so minute, as to make them scarcely worthy of being elevated from varieties into species.

The tendency of cultivators has lately been to multiply varieties, and to give them names as if they were separate species, thus extending the nomenclature of Ferns in an unnecessary and complex manner.

In the rich fern districts of Wales the varieties are infinite ; but in the present Work the specimens given are, as nearly as possible, the types of the several species ; the varieties being briefly noticed in the descriptions.

The directions for the cultivation of ferns, and the formation and position of the fernery, are given from the best authorities, and from the author's own experience.

WAINCYRCH, NEATH,
OCTOBER, 1855.

Directions for the Cultivation of Ferns.

HE principal points to be attended to, are:—

1. **Situation.** A North aspect, tolerably well shaded from the direct rays of the sun, and not subject to the drip of trees.

2. **Soil.** For most ferns the soil should be a compost of peat, loam, decayed leaf mould, and sand. Some require old mortar to be mixed with the compost, and some prefer a clayey soil; these will be especially noticed in the descriptions. In all cases, small pieces of brick, sandstone, or charcoal, about the size of hazel-nuts, should be mixed with the soil to keep it open.

3. **Moisture.** All ferns like moisture; therefore, great care should be taken that they be constantly supplied.

4. **Drainage.** This is one of the most essential points; for although ferns require so much moisture, yet they are materially injured if it be allowed to stagnate; therefore great care should be taken to effect a complete drainage. In pots the bottoms should be filled up at least two inches with pieces of broken bricks, pots, or stones, and above these should be spread a layer of Sphagnum, (a moss always to be found in boggy places, and which never gets mouldy), to prevent the soil washing or settling down among the drainage.

5. **Removing.** Great care should be taken in removing ferns not to injure the roots, but to retain as much as possible of the native soil with the plant. The best time is during the months of March and April.

6. **Growing from Seed.** A very interesting method of propagating from the seed or spores is recommended by Mr. Moore, in his “Handbook of British Ferns:”—“Half fill some shallow wide-mouthed pots with broken crocks, and on this put a layer of about two inches of turf peat soil and mellow loam, mixed with soft sand-stone broken in small lumps of the size of peas; this compost should not be much consolidated. Next, shake or brush very gently over a sheet of white paper a frond of the species to be propagated; the fine brown dust thus liberated consists of the spores, in greater or less quantity, intermixed more or less with the spore cases. This dust is to be regularly and thinly scattered over the rough surface of the soil, which is immediately to be covered with a bell-glass, large enough to fit down closely within the pot. The pots are at once to be set in feeders and these are to be filled up with water; they may either be placed under a hand-glass in a cold frame, or in a greenhouse or stove, as may be most proper. The first indications of germination will consist in the appearance of little semi-transparent green scales. The supply of water must be kept up, and the glasses should be tilted on one side for a short time every day, and ultimately entirely removed,—the pots still being retained under a hand-glass. After a week or two they may be taken up, carefully separated, and potted singly in small pots. The young plants should be still kept under a hand-glass until established, and then gradually inured to the degree of exposure proper for the mature plants.”

The following plan for growing ferns can be strongly recommended, having been found by the author to answer well:—

His fernery consists of a small house twelve feet by five, (facing the North); the roof is of glass, painted white, to prevent the entrance of too much light; nearly the whole of the front is occupied by a door, which during the summer consists of canvas stretched on a wooden frame; and in the winter of board, to keep the frost out; the inside is filled up with a combination of limestone, sandstone, and old trunks of trees, in which the ferns are planted; on the top of this rock-work there is a pipe perforated with very small holes, and connected with a tank of water: by this means a constant drip is obtained, and particular care has been taken to effect a thorough drainage.

This method would answer equally well where heat is used, and would be far preferable to potting the ferns and arranging them on shelves.

Wardian cases are much improved by the introduction of rock work in miniature, and those ferns which are accustomed to stony situations thrive better in consequence.

The parts of a Fern are :--

The *Roots*,—which are wiry-like fibres thrown out from the rhizome.

The *Rhizome*, or *Caudex*, is a root-like stem, in some ferns creeping either beneath or upon the surface of the soil or rock upon which it grows, and in others erect and tufted.

The *Frond* springs from the rhizome, and is a term applied to the stem and the leafy part of the fern, but generally refers to the latter part only, the stem being mentioned separately.

Fronds are either—

1. Simple, or undivided; as *Scolopendrium vulgare*, page 22.
2. Pinnatifid, or more or less deeply cleft, the divisions being termed lobes; as *Polypodium vulgare*, page 1.
3. Pinnate, or divided into distinct leaf-like divisions, called pinnæ; as *Asplenium viride* and *trichomanes*, page 17.
4. Bipinnate, the pinnæ themselves being pinnate,—this second series of pinnæ being called pinnules; as *Polypodium Dryopteris*, page 3.
5. The pinnæ, pinnatifid; as *Aspidium oreopteris*, page 9.
6. The pinnules, pinnatifid; as *Asplenium Filix-femina*, page 21.
7. The pinnules, pinnate; as *Pteris aquilina*, page 23.

The *seed* or *spores* of ferns are generally produced on the under surface of the frond, in little *capsules* or spore cases, surrounded by a jointed, elastic ring, which terminates below in a short stalk: the capsule when ripe splits open, and the ring by a series of jerks throws out the seed. The capsules are clustered together, and the clusters are called *sori*.



Polypodium Vulgare.

C O M M O N P O L Y P O D Y .

ALTHOUGH this species is very abundant, it is nevertheless, one of the prettiest and most interesting of ferns, for it is found covering those spots where there is the greatest scarcity of vegetation, such as bare rocks and walls; and when an aged oak begins to lose its vigour, this fern establishes itself on its trunk, as if to compensate for its want of verdure in other parts.

The young fronds make their appearance in May and June, issuing from all parts of the rhizome, except the growing point; they arrive at maturity in September, and remain green until the following spring, except in very exposed places.

The rhizome is thick, branching in all directions, and is covered at first with a dense, brown, wiry membrane, which falls off in the winter, leaving a smooth surface.

The stem is green, and nearly as long as the frond.

The fronds vary in length from two to eighteen inches; they are pinnatifid, the margin of the lobes being more or less serrated or notched.

The seed is produced on the under surface of the frond, and is of a bright yellow or orange colour at first, and brown when ripe.

Habitat.

Common on moss-covered trunks of trees, on rock, and walls, shady hedge-banks, and stone covered roofs.

Varieties.

This species is subject to several variations, the pinnæ being sometimes bifid or divided near the ends, and sometimes more or less deeply cleft. These varieties are scarce in Wales.

Culture.

In transplanting this fern, as much as possible of the moss and decayed matter with which the roots are surrounded should be removed with it. It grows freely in pots, if a light porous soil is used, and the rhizomes kept on the surface.

Mr. Newman, in his "History of British Ferns," mentions a very excellent method of cultivating this species in a green-house, viz., "in a wooden basket, made very open, which should be suspended. The rhizomes should be arranged in the bottom of the basket in such a manner that the fronds and the growing points of the rhizomes may pass through the interstices. They should then be covered with a thin layer of Sphagnum, over which spread a mixture of well decayed leaf mould and silver sand; then arrange a second layer of Sphagnum, and then a second layer of rhizomes, on which carefully fasten wooden cross bars, and the basket will be complete. Immerse the whole in soft water, until it is thoroughly saturated, and then suspend it in its final destination. This should be done in April, before any young fronds have appeared: in June and July young fronds will emerge through all the apertures in the basket, and will arrange themselves gracefully around it."



Polyzonaria Polyzona.

C. M. MCKEEVER.

ALTHOUGH this species is very abundant, it is not often one of the prominent objects of interest; for it is found covering those surfaces where there is the least chance for its survival, such as bare rocks and walls; and when it does not begin to grow on trees, it is easily overlooked, as it is composite for its whole existence in other parts of the country. It begins its life in May and June, issuing from the eggs which have been laid in the ground, and arriving at maturity in September, and remains on the trees until the following spring.

The plant is branched in all directions, and is covered all over with greenish-yellow scales, which fall off in the winter, leaving a smooth surface. The stems are green, and nearly as long as the frond. The leaves vary in size, from two to eighteen inches, they are compound, the segments being more or less rounded, and the leaflets being somewhat pinnate.

The seed is produced on the under surface of the frond, and is white, yellow, or orange, first, and brown when ripe.

Notes.

Common on unshaded trunks of trees, on rock, and half-shaded ledges, also on shaded rock.

Notes.

This species is subject to several varieties. The principal one occurring follows closely the original, and variations may be less deeply colored. From yellow to greyish-green.

Notes.

In propagating this crop, it must be possible to grow and develop plants with uniform roots and uniform shoots for propagation. It generally grows in soil of light peat humus, and the fibrous roots are the surface.

Mr. Meeker in his "Botany of British Columbia" gives a good method of extracting the roots of a germinating crop. This is done by holding the crop, which has suspended. The upper portion is stripped to the extent of one-third by such a process, so the fibrous root system remains suspended during the operation. The crop is then cut into a thin layer of four or five inches, which should consist of well developed, healthy and strong roots, a quantity of Sphagnum, and then a strong layer of sphagnum, so that each little tuft of roots may be held together, and the basket will be completely filled with the roots of various parts of the plant, and then suspend it in the water. This should be done by drifts, so that each plant may appear in its full strength, and every branch of the system in the basket, and will always remain perfectly natural.







POLYPODIUM

Giganteum

SPECIES.

UNLKY to the species just described, this elegant fern seems to shun the haunts of men, and to confine itself in the woods or near the hills and mountains of our mountains.

The young fronds appear in May, and develop very rapidly, arriving at perfection in July, and then off by the early frost, on the approach of winter.

The rhizome is thick, wiry, and creeping; and does not penetrate deep into the soil. The roots are few, very brittle, and never longer than the fleshy part of the frond, and is slightly

yellowish, very fleshy, four to fifteen inches in length; they are pliant, the joints being articulated.

The frond is produced on the outer surface of the rhizome, in circular clusters round the edges of the roots, and of a bright yellow.

HABITAT.

It grows in damp woods, and near streams, and even under the spray of waterfalls, in the mountain districts.

CULTURE.

This species is subject to very little variation.

CULTURE.

It is easy to cultivate this in pots or on rock-work, requiring to be periodically supplied with water, and constantly shaded from the rays of the sun, as too much light is prejudicial.

Planted in pots, the plants should be potted in light soil, great care should be taken to make a thorough drainage, and the pots should be placed in basins filled with water. The sun should be light and strong.



[II]

Polypodium Phlegopteris.

B E E C H F E R N .

OONTRARY to the species just described, this elegant fern seems to shun the haunts of men, and to seclude itself in the woods, or near the rills and waterfalls of our mountainous districts.

The young fronds appear in May, and develop very rapidly, arriving at perfection in July; but are soon cut off by the early frosts on the approach of winter.

The rhizome is tough, wiry, and creeping; and does not penetrate deep into the soil.

The stem is green, very brittle, and much longer than the leafy part of the frond, and is slightly scaly.

The fronds vary from four to twenty inches in length; they are pinnate, the pinnae being deeply pinnatifid.

The seed is produced on the under surface of the frond, in circular clusters round the edges of the lobes, and is of a brown colour.

Habitat.

Common in damp woods, and near streams, and even under the spray of waterfalls, in the mountainous districts.

Varieties.

This species is subject to very little variation.

Culture.

It is easy to cultivate either in pots or on rock-work, requiring to be plentifully supplied with water, and carefully shaded from the rays of the sun, as too much light is prejudicial.

If planted in pots, the rhizomes should be covered but lightly with soil: great care should be taken to effect a thorough drainage, and the pots should be placed in feeders filled with water. The soil should be light and strong.

[III]

Polypodium Dryopteris.

O A K F E R N .

PTHE brilliant green colour, and the delicacy of this little fern, cannot fail to charm the beholder. Like the last species, it seeks seclusion, but in dryer situations.

The young fronds appear in April, each at first resembling three little balls on wires ; they are soon developed, and bear seed as early as June, but disappear before winter.

The rhizome is very slender and creeping, and when long established, forms a dense mass.

The stem is long and slender, dark purple and shining, and clothed with a few scales at the base.

The fronds are from four inches to a foot in length, of which the stem forms two thirds ; they are divided into three triangular branches, each having a short stem which unite at a point with the main stem ; each division of the frond is pinnate, and the pinnæ are pinnate at the base, and pinnatifid at the centre and end.

The seed is produced in clusters on the under margin of the pinnules and lobes, and is of a brown colour.

Habitat.

Not so common as the last species, but nevertheless abundant in the mountainous districts. It grows in woods, and in shady, rocky places.

Varieties.

This species never seems to vary, unless the next species be considered a variety—which is not at all unlikely, as they resemble one another very closely.

Culture.

It is easily cultivated, should have a light soil, be protected from the rays of the sun, and be well supplied with moisture.







Hypnum Calycinum.

L. L. THOMAS, F. R. S. & C. F. D. COOKSON

There are so many species of the sub-genus *Calycinum* that it is difficult to distinguish one from the other.

The species described here appear in May, and may apply to nothing else.

The plant is creeping, and smaller than the last species. The stem is pale-coloured, and much longer than the root, and is clothed with scales. The leaves are from six to eighteen millimetres in length; they are partially three-ribbed, but the middle rib is much smaller than the two side ones. The colour of the leaves is a dull green, and being covered with very numerous short hairs, gives a downy appearance to the plant, and the scaly stems are excellent distinguishing characters.

The capsule is produced in clusters on the upper portion of the pointed pedicels, and is of a

yellowish-green colour, and is of rare occurrence. It has been found near Brecon, on the Brecon road, the only place hitherto recorded is Gloucester, in England, though it is thought that it grows elsewhere. It has been passed by in mistake for the last species.

It is very difficult to identify, and I am more sure than Dr. Gray does that it is right to name it *Hypnum calycinum*. Care should be taken in the use of the name, as it is a common name.



Polypodium Calcareum.

LIMESTONE POLYPODY.

HIIS species so nearly resembles the last-mentioned that at the first glance one may easily be mistaken for the other.

The fronds appear in May, and soon arrive at maturity.

The rhizome is creeping, and stouter than the last species.

The stem is pale coloured, and much longer than the frond, and is clothed with scales.

The fronds are from six to eighteen inches in length ; they are partially three-branched, but the lower pinnae are much smaller than the centre division. The colour of the fronds is a dull green, owing to their being covered with very small stalked glands, giving a downy appearance to the surface ; which, and the scaly stem, are excellent distinguishing characters.

The seed is produced in clusters on the under margin of the pinnules and lobes, and is of a brown colour.

Habitat.

It is confined to the limestone districts, and is of rare occurrence. It has been found near Merthyr-Tydvil on the Brecon road ; the only other locality recorded is Llanferris, in Denbighshire. There is little doubt that it grows elsewhere, but has been passed by in mistake for the last species.

Culture.

It will bear more sun than *Dryopteris*. The soil should be light and intermixed with lime or old mortar. Care should be taken not to give it too much moisture.

* *Woodsia Ilvensis.*

R A Y ' S W O O D S I A .

WHIS is the rarest Welsh fern, being found only in one county, and there only in a very few places. It is equally rare as a British species, being found only in two English and three Scotch counties. The young fronds appear in the spring, and die down before winter.

The roots are black and wiry; the rhizome is thick and tufted.

The stem is very distinctly jointed at a short distance from its junction with the rhizome; it is of a yellowish colour when mature, and is covered with scales and hairs, as is also the whole of the frond, especially the under surface, the sori being nearly concealed by them.

The fronds, including the stem, are rarely found more than six inches in length: they are pinnate, and the pinnae are pinnatifid.

The seed is produced on the under edge of the lobes.

Habitat. In the fissures of rocks—in the most bleak and exposed situations. It has been found on Snowdon and Glyder-Vawr, in Caernarvonshire,—but in very small quantities.

Varieties. There is a very distinct variety of this species, called *Hyperborea*, which some authors consider a species, but it so much resembles *Ilvensis* in general characteristics, that others have placed it among the varieties. It is equally, if not more, rare than *Ilvensis*, and has been found in the same localities; the fronds are much narrower than those of *Ilvensis*, and the pinnae are more distant from each other, and are nearly triangular.

Culture. The Woodsia may be easily cultivated either with or without heat: if without, it should have a free circulation of air. The soil should be light and mixed with small pieces of granite or sandstone; the rhizomes should be wedged between two pieces of stone. The plant should be well supplied with moisture, which should be carefully drained off.

Ceterach Officinaria.

SCALE FERN.

Aspecies peculiar for being rarely found in its native habitats, but on old walls and ruins.

The young fronds appear in the spring, and remain evergreen for several years.

The roots are very short, and are remarkable for their power of penetrating mortar; the rhizome is tufted.

The stem is short, thick, and covered with narrow pointed scales.

The fronds vary in length from four to eight inches: they are deeply pinnatifid, the divisions being alternate.

The whole of the under surface of the frond is covered with dense scales, beneath which are the capsules in oblong clusters. The colour of the scales at first is nearly white, changing to brown when the frond is mature.

Habitat. Abundant in the limestone districts of South Wales, but not so common in North Wales.

Varieties. This species never seems to vary.

Culture. It is not easily cultivated, which probably arises from the roots having been injured in removing. It should be planted in a shady place, and be well supplied with moisture,—which should be given to the roots only and not to the fronds. The soil should have old mortar and small stones intermixed.

* The specimens given of Woodsia *Ilvensis* are Norwegian, but are precisely similar to those of Wales, of which it would have been impossible to get sufficient for this work.



Alpinia officinalis

Roots and rhizome.

Roots in the rarer. Well known throughout the country and very abundant. It is equally rare as a Medicinal plant, but it is used for its aromatic properties. The young roots contain the oil of Alpinia which has aromatic properties.

The roots are blackish, very bitter tasting to the tongue.

The stem is very slender, pale green or dark brownish green, 2 to 3 feet high, reddish when mature, and covered with scales and hairless, with a few small hairs on the upper surface, these being mostly covered by them.

The leaves are long, lanceolate, thin, bright green, smooth, without hairs, and the petioles are pointed.

The root is gathered on the white edge of the hills.

In the position of roots—on the green stalk and exposed situation, it grows well, but does not grow well in shade, and requires full sunlight.

This is a very strong species of *Alpinia*, of the *officinalis* which seems to be a species, and it so easily recognises itself in several characteristics, that one need not be afraid of mistaking it among the varieties. It is larger than most, and than *Alpinia galanga* from the same location. The buds are much smaller than those of *Officinalis*, and the petals more divergent from each other, and are nearly equal in size.

Soil. The *Alpinia* may be easily cultivated either in soil or without him, if there should be a free circulation of air. The soil should be loose and mixed with small stones or pebbles; the stems should be buried for half the length of stems. They should be well supplied with moisture, which should be carefully drained off.

Crataegus

Crataegus

Chinese provide the best, most durable, and most lasting timber in the world.

The young trees increase in diameter, and become crooked for several years.

They are cut down, and are not suitable for the purpose of producing timber, because they are crooked.

The wood is hard, thin, and contains many narrow pinholes, also.

The wood may be used for building, for furniture, they are easily planed, the wood being smooth.

The wood of the wood is used in making fine doors and windows, because it is very hard, and the wood is not easily broken, therefore, it is used for doors and windows.

The wood is used for making fine doors, and windows, and doors, and windows.

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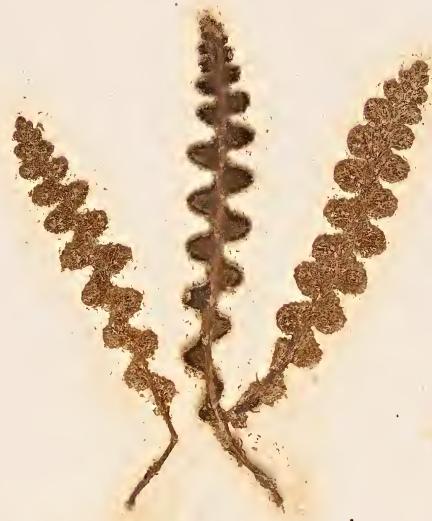
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Aspidium Fontanis.

HABITAT.

This fern is not found, for the fronds are nearly as rigid and prickly as holly. It has only been found in the Snowdon district, and there only in the highest and most

exposed situations, where it appears early in the Spring, and remains evergreen for many years.

The rhizome is thick, very strong; the rhizome is naked and covered with scales, as is also the stipe, which is very short.

The pinnae are from three to eight or nine inches in length; they are pinnate, and the pinnae are serrated, the serrations terminating in sharp spines.

The sori are produced in large circular clusters, on the under surface of the pinna, in a regular line between the mid-vein and the margin. It has a dark brown colour when mature.

HABITUS.

This fern has been found on Mael Hebog, Glyder Fawr, and on rocks above Llyn Idwal, in Snowdonia.

FRONDS.

This species is the first of a group that are subject to a great deal of variation, and take so many forms, that it is difficult to determine which are the species, and which the varieties. The next Fern to longitiss. is lobatum; it is very considered a species, it is not so rigid as longitiss., and is found generally near streams in the mountainous districts.

CULTURE.

This fern is rarely found in culture in our gardens. If potted, it should be placed in two pots of stone; the soil should be light and sandy; the roots should be well supplied with moisture, which should be carefully drained off.



Aspidium Lonchitis.

H O L L Y F E R N .

HIIS species is well named, for the fronds are nearly as rigid and prickly as holly. It is a very scarce fern, being only found in the Snowdon district, and there only in the loftiest and most inaccessible places.

The young fronds appear early in the Spring, and remain evergreen for many years.

The roots are black, wiry, and very strong; the rhizome is tufted and covered with scales, as is also the stem, which is very short.

The fronds are from three to eighteen inches in length; they are pinnate, and the pinnæ are deeply serrated, the serratures terminating in sharp spines.

The seed is produced in large circular clusters, on the under surface of the pinnæ, in a regular series, half way between the mid-vein and the margin. It is of a dark brown colour when mature.

Habitat.

It has been found on Moel Hebog, Glyder Fawr, and on rocks above Llyn Idwell, in Caernarvonshire.

Varieties.

This species is the first of a group that are subject to a great deal of variation, and take so many intermediate forms,—which are, as it were, connecting links with one another,—that it is difficult to determine which are the species, and which the varieties. The next link to *Lonchitis* is *Lobatum*: by many considered a species. It is not so rigid as *Lonchitis*, and is found generally near streams in the mountainous districts.

Culture.

This fern is rarely found to succeed in out-of-door ferneries. If potted, it should be wedged between two pieces of stone; the soil should be light and sandy; the roots should be well supplied with moisture, which should be carefully drained off.

[VIII]

Aspidium Aculeatum.

PRICKLY FERN.

HIIS seems to be the next link to the variety—*Lobatum*—just mentioned.

The young fronds appear in April, the ends being curved back in a very graceful manner. They arrive at maturity in July, and remain green till the following spring.

The roots are long, strong, and tough; the rhizome is tufted and woody.

The stem is short, and covered with large scales.

The fronds are from one to three feet in length; they are pinnate, the pinnae being deeply pinnatifid, and the edges of the divisions prickly.

The seed is produced in circular clusters on the under surface of the pinnae.

Habitat.

Common in hedge-rows, and by the sides of streams.

Culture.

It is readily cultivated either in or out of doors. The soil should be tolerably rich.



Lomaria Architans.

CLACKA VINE.

THIS is another of the most common ferns—Lobaria—so-called mentioned.

The young fronds open in April, the rachis being curved back in a very graceful manner. They are of a yellowish green, and remain green till the following spring. The root is long, slender, and tough, the rhizome fleshy and woody. The stem is short, and covered with large scales. The frond is from one to three feet in length; they are pinnate. The pinnae have narrow blades, and the rachis of the divisions weakly articulated, so that they are easily broken off. The rachis is covered with circular blisters on the greater surface of the plant.

Common.

Common in hedge-rows, and by the sides of streams.

Common.

Commonly polished either in houses or doors. The cell walls are usually now





Asplenium Sordidum.

SOFT PLAIN FERNS.

This species so nearly resembles the last mentioned, that it is difficult to tell out the differences. The root and rhizome are similar to those of *A. glaucum*. The stem is longer, and the fronds are more delicate, being set off by the wavy fronds, and the sori opposite instead of parallel.

Habitat.

Grows in woods and in hedge-rows.

Cultivation.

It is rarely cultivated as the last species.



[IX]

Aspidium Angulare.

S O F T P R I C K L Y F E R N .

HIIS species so nearly resembles the last mentioned, that it is difficult to point out the differences.

Its roots and rhizome are similar to those of *Aculeatum*.

The stem is longer, and the fronds are more delicate, being cut off by the wintry frosts; and the pinnæ are pinnate instead of pinnatifid.

Habitat.

Common in woods and in hedge-rows.

Culture.

It is as easily cultivated as the last species.

[X]

Aspidium Oreopteris.

MOUNTAIN FERN.

HIS is by no means an abundant British species, although it occurs plentifully in Wales.

The young fronds appear in May, and die down on the approach of winter; they spring in a circle from the rhizome.

The roots are numerous and wiry; the rhizome is tufted and scaly.

The stem is short and covered with scales.

The fronds are from one to four or five feet in length; they are pinnate, the pinnae are deeply pinnatifid, and are very short at the base, gradually lengthening to the centre, and diminishing to the top. Over the surface of the under side of the pinnae are scattered small, yellowish, glandular globules, which, when pressed, emit an odour not at all disagreeable.

The seed is produced in circular clusters on the under margin of the lobes, and is of a brown colour.

Habitat.

It occurs on damp heaths, hedge-rows, and in woods.

Varieties.

This species never seems to vary.

Culture.

Some cultivators find this a difficult species to establish. If planted in pots, they should be large, well drained, and placed in feeders of water; the soil should be clay or yellow loam. The plants should be well shaded.



X.
Asplenium Creptans

W. M. G. 17. 18. 19.

This fern is by no means an abundant forest species, although it is generally to be found.

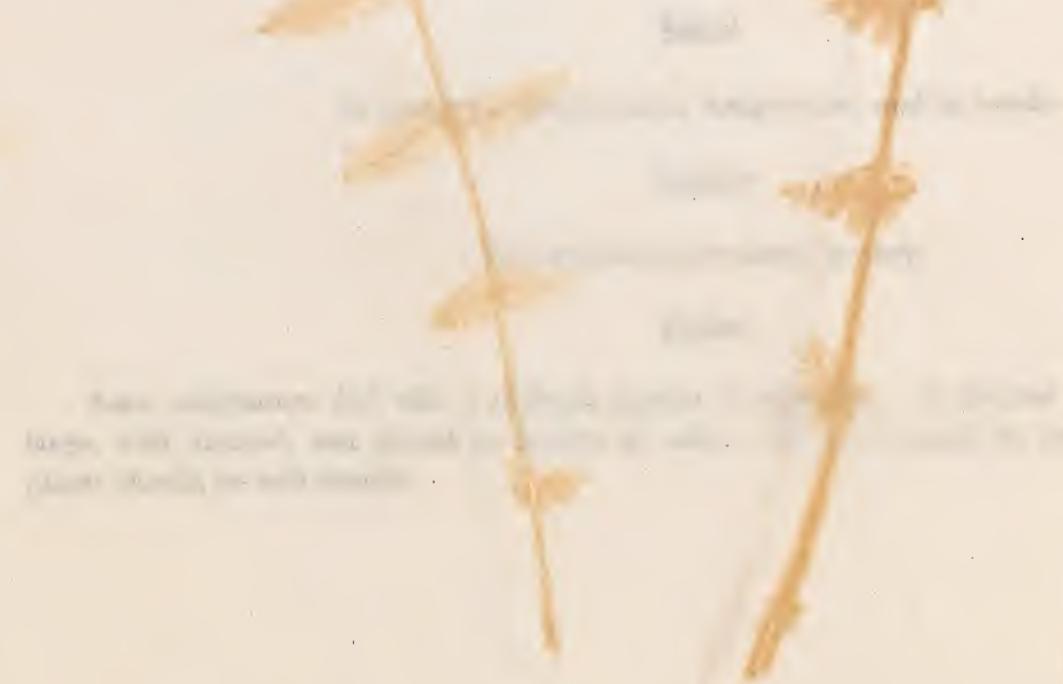
The young fronds appear in May and June on the surface of the soil, they spread out from the rootstock.

The roots are numerous and wiry, the rhizome is rather short.

The stem is slender, covered with scales.

The fronds are one to four or five feet in length, the rachis is smooth, somewhat flattened, and the pinnae, which in the base gradually become longer, are narrow and pointed at the top. There are several on either side of the rachis, the upper ones being smaller, while the lower ones are not so large.

The seed is produced in the axils of the pinnae, or on the under surface of the rachis, and is of a dark color.



These ferns are often found growing on the surface of the ground, or on the trunks of trees, with various mosses and other small plants, although they are also found in the air or yellow loam.





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Asplenium Ochroleucum

M A R S H F E R N

very local species—only four Welsh localities being known.

The fronds are of two kinds, barren and fertile; the barren appear in May, and the fertile in June, and both die down on the approach of winter.

The roots are black and fibrous; the rhizome is creeping, nearly smooth and of a dark colour; the stem is very long and slender, but thicker in the fertile fronds.

The barren fronds are from one to two feet in length, the sterile often with the habit of feathery pinnules.

The fertile fronds are much less abundant than the barren ones.

They are produced in clusters on the under margin of the leaves.

Habitat.

It grows only in bogs and marshy places. The localities are Llanberis, in Caernarvonshire; Bodnant lake, Pentraeth, in Anglesey; Singleton bog, in Glamorganshire, and Penally bog, near Tenby, Pembrokeshire.

Cultivation.

It is difficult to cultivate.

Soil.

This species thrives well in cultivation. The soil should be composed of peat and decayed leaf-mould; the rhizome should be placed near the surface of the soil, the marsh moisture easier to obtain, and it should not be exposed to strong sun.



Aspidium Thelypteris.

M A R S H F E R N .

As very local species,—only four Welsh habitats being known.

The fronds are of two kinds, barren and fertile; the barren appear in May, and the fertile in June, and both die down on the approach of winter.

The roots are black and fibrous; the rhizome is creeping, nearly smooth, and of a dark colour.

The stem is very long and slender, but thicker in the fertile fronds.

The barren fronds are from one to two feet in length, the fertile often attain the height of four feet; both are pinnate.

The fertile fronds are much less abundant than the barren ones.

The seed is produced in circular clusters on the under margin of the lobes.

Habitat.

It is found only in bogs and marshy places. The localities are Llanberis, in Caernarvonshire; Llwydeard lake, Pentraeth, in Anglesea; Singleton bog, in Glamorganshire; and Pennalle bog, near Tenby, Pembrokeshire.

Varieties.

It is subject to no variation.

Culture.

This species thrives well in cultivation. The soil should be composed of peat and decayed leaf-mould; the rhizome should be planted near the surface of the soil; too much moisture cannot be supplied, and it should be allowed to stagnate.

[XII]

Aspidium filix-mas.

MALE FERN.

ASPIDUM is one of our most abundant species. The young fronds appear early in the Spring, and survive the winter.

The rhizome is tufted and covered with brown scales, as is also the stem, which is short and stout.

The fronds are from one to four feet in length; they are pinnate, the lower pinnae being pinnate, the upper ones pinnatifid.

The seed is produced in circular clusters, on the under surface of the lobes, half way between the mid-vein and the margin.

Habitat.

Abundant everywhere in hedge-rows, and in woods.

Varieties.

There is a variety rather abundant in some parts of Wales, in which the pinnae are pinnate, and the pinnules are deeply serrated: fronds often occur, in which the pinnae are bifid, or divided near the extremity.

Culture.

This species is readily cultivated, requiring a light porous soil.



Lobaria pulmonaria

July 1867

The upper surface of the leaf is smooth, the lower deeply granular, the midrib double, and ends in a sharp point, which is continued downwards, becoming rounded from the middle, and ending in a small hook.

The frond is about 10 cm. long, and perhaps 5 cm. wide, the lower surface covered with a dense layer of brownish granules, the midrib and veins being lighter, and the margin

sharp, the lobes acute, and the points acute, and the granules





Aspidium Fernaceum.

NETTLES & CO. LTD.

This is the first of a group of ferns, which are subject to so much variation, that it is difficult to determine exactly what is the true species. Of the three so-called species here given, I consider *A. Fernaceum* to be the true one, but I am unable to discover which is the type of the species.

In this species, the young fronds appear in May, and do not attain their winter or ultimate height until October. The rhizome is tufted, and covered with pale brown scales; also with a few short hairs on the stem, which is stout and rather long.

The fronds are from one to three feet in length, very stiff, slender; the pinnae being simple, undivided, the lobes terminating in sharp points; the shape, the opposite, four of five of the lower pinnae being equal in length, the others increasing in the extremity.

The seed is produced in clusters of two or three on the under surface of the pinnae.

Habitat.

Common in Canada and in hedge-rows.

Beds.

As before stated, this species is subject to considerable variation.

Opus.

Place of cultivation in a light, porous soil.



[XIII]

Aspidium Spinulosum.

WITHERING'S BROAD FERN.

HIS is the first of a group of three, which are subject to so much variation, and are so closely allied to each other, that it is difficult to determine which are the species and which the varieties. Of the three so-called species here given, I consider two to be varieties of the other, though I am unable to discover which is the type of the species.

In this species, the young fronds appear in May, and often survive the winter in sheltered places. The rhizome is tufted and covered with pale brown roundish scales, as is also the lower part of the stem, which is stout and rather long.

The fronds are from one to three feet in length; they are bi-pinnate, the pinnules being deeply notched, the lobes terminating in sharp spines; the pinnæ are opposite, four or five of the lower pairs being equal in length, the others narrowing to the extremity.

The seed is produced in circular clusters on the under surface of the pinnules.

Habitat.

Common in woods, and on hedge-rows.

Varieties.

As before stated, this species is subject to considerable variation.

Culture.

Easy of cultivation in a light, porous soil.

[XIV]

Aspidium Dilatatum.

B R O A D F E R N .

NEXT to our common brake fern, this is the finest species we have.

The fronds appear in May, and often survive the winter.

The rhizome is tufted, and covered with lanceolate scales, the centre being of a dark brown colour, and the edges of a light brown.

Most part of the stem is covered with similar scales; it is stout, and occupies about one-third of the whole length of the fronds, which often measure five feet.

The fronds are bi-pinnate, the lower pinnules being again pinnate, the upper deeply serrated, the lobes terminating in spines. The pinnae are opposite the first one or two pairs, being considerably shorter than the others, the next very wide, the others gradually narrowing to the extremity.

The seed is produced in circular clusters on the under surface of the pinnules.

Habitat.

Common in woods, and on shady banks.

Varieties.

Like the last species, this is subject to considerable variation.

Culture.

It may be readily cultivated in a light and porous soil.



Aquilegia

1892

As yet we have no common break from this it follows me to see how

The seeds come in this and what covers them.

Two millions are raised and covered with *Leavenworthia* leaves the same being all
collected the seeds of which broken.

Most parts of the plants are eaten off before they open, and others before
the whole length of the stalks where the flowers are seen.

The roots are big, long, like long parsnips, brownish yellow, the upper part of
the lobes transparent white. The leaves are opposite the stem and in two pairs, being
more or less different in the other, the next one with the others especially according to the
order in which it is produced in similar manner to the above stages of the plant.

1892

After the first opening, the upper leaflets almost double, continuing

it may be easily distinguished from the old plants and





Aquilegia formosa

RAY-FLOWERED OR HORSES-TAILS

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This is the smallest of the group just referred to, and the most interesting, owing to its beautiful green colour contrasted with a dark purple stem.

The flowers appear about May, and are cut off by the early frosts.

The rhizome is tilted, and densely covered with long narrow pale brown scales, as is also the root which is as long as the root, the scales being jagged at the ends; the colour of the stem is dark

purple, and the leaves are from one to two feet in length, they are three-lobed, the primaries being ovate, and the sub-primaries deeply pinnatifid; the lower pair of leaves are twice the largest. The flower-head is triangular or deltoid, the colour pale green. It has a crimped appearance, caused by the lobes being concave, and the edges curled upwards; on this account this species has been called by some authors "Recurvum" and this perhaps explains its particular name in the herbarium.

The seed is produced in circular clusters on the under surface of the petals.

Habitat.

Found in shady, rocky places, but of rare occurrence in Snow-Wales, having been found only at a small waterfall in the Vale of Neath. It is by no means abundant in North Wales, but occurs occasionally in the Sedbury district, but it occurs in the Ryhope coal-mines in abundance.

Flowers.

There are several varieties mentioned of this species, but nothing seems to have been found in

Affines.

It grows readily in a heavy soil, requiring plenty of water and shade.



[XV]

Aspidium Foenisecii.

HAY-SCENTED OR BREE'S FERN.

HIS is the smallest of the group just referred to, and the most interesting, owing to its beautiful green colour contrasted with a dark purple stem.

The fronds appear about May, and are cut off by the early frosts.

The rhizome is tufted, and densely covered with long narrow pale brown scales, as is also the stem, which is as long as the frond, the scales are jagged at the end; the colour of the stem is dark purple.

The fronds are from one to two feet in length; they are bi-pinnate, the pinnules being again pinnate, and the sub-pinnules deeply pinnatifid; the lower pair of pinnæ are much the largest. The shape of the frond is triangular or deltoid, the colour pale green; it has a crispy appearance, caused by each of the lobes being concave, and the edges curled upwards: on this account this species has been named by some authors, *Recurvum*; and this crispness renders it particularly difficult to prepare for the herbarium.

The seed is produced in circular clusters on the under surface of the pinnules.

Habitat.

Found in shady, rocky places, but of rare occurrence in South Wales, having been found only at the Melincourt waterfall, in the Vale of Neath. It is by no means abundant in North Wales, being met with occasionally in the Snowdon district; but it occurs on the Holyhead mountain in some quantity.

Varieties.

There are several varieties mentioned of this species, but neither seems to have been found in Wales.

Culture.

It grows readily in a loamy soil, requiring plenty of water and shade.

[XVI]

Cystopteris fragilis.

BRITTLE FERN.

THIS is one of the prettiest of the small ferns, and remarkable for its delicate and fragile nature.

The fronds appear in spring, and die down towards the end of autumn.

The rhizome is short and creeping. The stem is smooth, about one-third the length of the frond, which varies from six to eighteen inches. The fronds are bi-pinnate, the lower pinnules being deeply pinnatifid, and the upper ones serrated. The seed is produced in circular clusters on the under surface of the pinnules, rather nearer the mid-vein than the margin.

Habitat.

Tolerably abundant in mountainous districts in rocky, shady situations.

Varieties.

This species is subject to considerable variation, many of the varieties being very interesting, and considered as distinct species by some authors; but I cannot regard them as other than varieties.

Culture.

It is readily cultivated either out of doors or in a green-house, requiring moisture and shade.



Cylopterus fragilis.

BRIEF DESCRIPTION

This is one of the prettiest of the small ferns, and remarkable for its beauty.

The fronds appear in spring, and die down towards the end of autumn. The rhizome is short and creeping. The stem is smooth, about two feet long, which may be reduced to eighteen inches. The fronds are bipinnatifid, deeply pinnatifid, and the upper ones serrated. The sori are produced under surfaces of the pinnae, either above the midrib near the margin,

Other

Colorless almost, or faint brownish tints in rock, sandy soil.

Other

This species is subject to considerable variation, many of the varieties being so distinct as scarcely to merit specific rank; but I can only distinguish

dwarf.

Occasionally, instead of the usual form, a specimen occurring





Asplenium Spathulatum

(L.) Gray. (A. glaucum Willd.)

This is the first of the commoner species, Asplenium glaucum.

The fronds appear to be all of a similar length.

The rachis are slender, and give birth directly to the sterile pinnae; the soriocarps are tilted at an angle to the rachis, and the pinnae are from two to four furrows long, and have the appearance of great fan-like structures in profile. The rachis is produced in elongated curves on the under surface of the frond near the soriocarps.

Botany.

Very rare. Occurs in the following localities in Gwynedd and Anglesey—namely, at Llewellyn, 1200 ft. above Mawddach, Bod Lechen, Snowdon Gwyl, near Pont y Pair, and Pen Dethys.

Cultivation.

Notes.

Botany.

Being a tender fern, this requires some careful cultivation. It succeeds well in pots in a cold frame, requiring plentiful waterings which should be well drained off.

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Asplenium Nidus

(L.) Gray. (A. nidus Willd.)

A small pinnate fern used by Indians as a cushion, as it grows constantly on the roofs of their huts.

Fronds, which are evergreen, appear in clusters of three.

Soriocarps are either oval or round, and are much tilted together. The pinnae, and stipe, are shorter than the rachis, the length of the rachis being in general three or four times the length of the pinnae. The rachis is produced in elongated curved clusters on the under surface of the frond.

Botany.

Notes. (See also *Asplenium nidus*, note.)

Botany.

Another variety of this important fern which many authors regard as a distinct species, is the name of *A. latissimum*; it resembles the usual *Nidus*, but is sharply pinnatifid, being bipinnatifid. It is very rare, and has been found near Llanuwchllyn, and on Moel y Georau-y-wlch.

Botany.

This does not easily succeed from its seed unless treated, but if it be desired to cultivate it, it should be planted amongst broken shells and old manure, and be well sparingly supplied with water.

A. *latissimum* given in this edition, measured by the original drawing, was precisely similar to those figures in the old editions.



* *Asplenium Septentrionale.*

F O R K E D S P L E E N W O R T .

HIIS is the first of the interesting genus, *Asplenium* or Spleenwort.

A The fronds appear in April, and remain evergreen.

The roots are strong, and penetrate deeply into the crevices of rocks ; the rhizomes are tufted and often matted together in large masses. The fronds are from two to four inches long, and have very much the appearance of grass, but terminate in forks. The seed is produced in elongated clusters on the under surface of the frond, near the forked ends.

Habitat.

Very rare. Occurs in the following localities in Caernarvonshire and Denbighshire :—namely, Carnedd Llewellyn, Llyn y Cwm, Pass of Llanberis, Moel Lechog, Bettws y Coed, near Pont y Pair, and at Llan Dethyla.

Varieties.

None.

Culture.

Being a tender fern, this requires much care in cultivation : it succeeds well in pots in a cold and shaded frame, requiring plentiful moisture, which should be well drained off.

Asplenium Ruta-muraria.

R U E - L E A V E D S P L E E N W O R T .

HIIS pretty little fern must be familiar to everybody, as it occurs abundantly on the walls of most old buildings.

The fronds, which are evergreen, appear about May or June.

The roots are black and wiry ; the rhizomes are tufted, and are much matted together. The stem is long, and stronger than the frond, the length of the whole being in general three or four inches. The frond is triangular and bi-pinnate. The seed is produced in diamond shaped clusters, which cover the under surface of the pinnules.

Habitat.

Common on rocks and old walls.

Varieties.

The only variety of any importance is one which many botanists regard as a distinct species, under the name of *A. Germanicum* ; it resembles the normal *Ruta-muraria*, but is simply pinnate, instead of being bi-pinnate. It is very rare ; and has been found near Llanrwst, and on Moel Lechog, in Caernarvonshire.

Culture.

This fern does not thrive if removed from its native walls or rocks ; but if it be desired to cultivate, it should be planted amongst broken bricks and old mortar, and be but sparingly supplied with moisture.

* The specimens of *A. Septentrionale* given in this work were procured by the author in Norway, and are precisely similar to those found in Wales.

Asplenium Trichomanes.

MAIDEN HAIR SPLEENWORT.

HIIS is a well-known little fern, and a particular favourite with cultivators.

The fronds make their appearance in April or May, and are persistent through the winter.

The roots are peculiarly adapted for penetrating into almost invisible fissures in rocks. The rhizome is tufted. The stem is short and black, which together with the frond, extends from three to nine inches. The frond is pinnate, the pinnæ being from a quarter to half an inch in length, and oblong. The seed is produced in clusters, which are arranged diagonally to the mid-veins of the pinnæ.

Habitat.

On hedge-rows, walls and rocks, everywhere.

Varieties.

There is one marked variety, the pinnæ of which are deeply pinnatifid. I have found it near Penrice Castle, in Glamorganshire.

Culture.

It is most readily cultivated, requiring no particular directions.

Asplenium Viride.

GREEN SPLEENWORT.

HIIS species much resembles the last, but is more interesting from its brilliant green colour and comparative rarity.

The fronds, which are evergreen, appear in May or June.

The roots are delicate and fibrous, the rhizome tufted. The stem is green and about a third as long as the frond, the whole length being from two inches to a foot. The frond is pinnate; the pinnæ are triangular, and notched in the margin. This triangular shape of the pinnæ, and the brilliant green colour of the stem and frond, form the distinctions between this and A. Trichomanes. The seed is produced in clusters similar to the last species.

Habitat.

Generally in moist shady situations; often under the drip of waterfalls. It occurs in the Snowdon district, on the Brecon Beacon, at Ysgwd Henrhŷd Waterfall, and on the Cribarth Mountain in the Swansea Valley, and under the Upper Cilhepste Waterfall, in the Vale of Neath.

Varieties.

I have not met with any.

Culture.

This species thrives well in greenhouses, if planted in pots or on rockwork, and well supplied with moisture.



Saxifrage or *Yellow Willow-herb*, and a small shrub with red berries.

The leaves are alternate, those above being palmately compound, and deeply lobed.

The stems are generally erect, and the upper part is almost upright. The stem is clothed with a few small hairs, and ending with a few small leaves. The frond is green, and about three-quarters of an inch long, and oblong. The seed is produced in a capsule which is attached to the pinnæ.

On hedge-rows, field and roads, everywhere.

Burrs.

There is one variegated variety, the pinnæ of which are deeply pinnatifid. Found near Castle, in Gloucestershire.

Cotyledons.

It is most readily cultivated, requiring no particular care.

Scrophularia

Asplenium Vittatum

DAURIAN SPIDER-WORT.

This species has received the last, but is more interesting from its having given rise to a comparative variety.

The roots, which are common, appear blackish or brown.

The roots are fibrous and brown, the whole plant being brownish or black. The frond is long as the root, the whole length being about two inches. The frond is smooth and triangular, and divided into segments. This triangular shape of the pinnæ is the chief point of difference between this and the common species. The seed is produced in clusters attached to the frond.

Roots.

Found in most rocky situations, also near the base of waterfalls. It was found growing on the Dovedale, Derwent, Tissington Waterfall, and at the head of the Derwent Valley, and near the Churnstone Waterfall, in the Vale of

Gloucester, where it is sometimes a growth on parts of the rockwork, but will grow







Asplenium Maris.

S. A. S. P. L. & A. Y. (1872)

ATHIS is a truly marine species, being almost always found within reach of the spray of salt water.

The fronds appear early in the summer, and are evergreen.

The roots are tough, and penetrate the rocks, so as to be removed with difficulty. The rhizome is tufted and hairy. The stem is strong, shining black, and about one-third as long as the frond. The frond is from three to twelve inches long, and *pinnules* the pinnae being oblong, and more or less serrated. The seed is produced in clusters, disposed like those of *A. Trichomanes*.

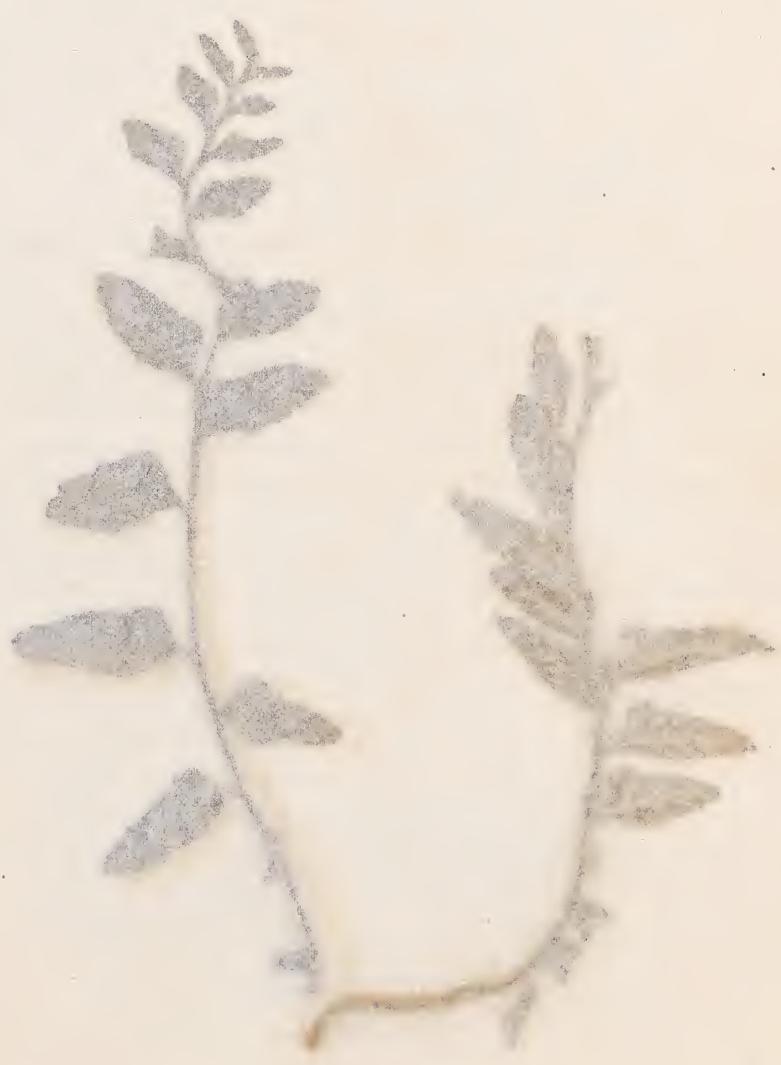
Habitat.

On rocks, and in crevices near the coast. I have found it near Margam Abbey, Glamorganshire, at least three miles from the sea,—but there is reason to believe that the sea has receded from its former margin. It has also been found near Penllyn, in Caernarvonshire, at a still greater distance from the sea, but in this case the sea has long shut out by a dike.

Cultivation.

There is no native variety.

This fern generally requires artificial heat, but may be made to thrive in a cold frame. It should be wedged between two stones, even if potted. The soil should be light and stony.



[XXI]

Asplenium Marinum.

SEA SPLEENWORT.

HIIS is a truly marine species, being almost always found within reach of the spray of salt water.

The fronds appear early in the summer, and are evergreen.

The roots are tough, and penetrate into rocks, so as to be removed with difficulty. The rhizome is tufted and hairy. The stem is strong, shining black, and about one-third as long as the frond. The frond is from three to twenty inches long, and pinnate; the pinnæ being oblong, and more or less serrated. The seed is produced in clusters, disposed like those of *A. Trichomanes*.

Habitat.

On rocks, and in caves along the coast. I have found it near Margam Abbey, Glamorganshire, at least three miles from the sea,—but there is reason to believe that the sea has receded from its former margin. It has also been found near Pont Aber-glaslyn, in Caernarvonshire, at a still greater distance from the sea; but in this case the sea has been shut out by a dike.

Varieties.

There is no distinct variety.

Culture.

This fern generally requires artificial heat, but may be made to thrive in a cold frame. It should be wedged between two stones, even if potted; the soil should be light and stony.

Asplenium Lanceolatum.

HUDSON'S SPLEENWORT.

HIIS, like the last species, is generally found within a short distance of the sea-coast, but is by no means abundant.

The fronds, which are also evergreen, make their appearance in May.

The roots are black and penetrating. The rhizome is tufted. The stem is about one-third the length of the frond, and is covered with hair-like scales. The fronds are from three inches to a foot long, and pinnate, the pinnae being either pinnate or pinnatifid, and the edges of the pinnules serrate. The form of the frond is lanceolate, whence the fern derives its name. The seed is produced in circular clusters near the margin of the lobes.

Habitat.

On rocks and in caves, near Llanrwst; on rocks above Tremadoc, and on a rock called Careg-y Ymbil, in Pwllheli harbour, in Caernarvonshire; on the left hand side of the road between Barmouth and Dolgelly, about a mile from the former place; and near Aber-glaslyn in Merionethshire; and on the south coast of Ramsay Island, near St. David's, Pembrokeshire.

Varieties.

None.

Culture.

It thrives well in a pot, either with or without heat, if protected and thoroughly drained, and prefers a rough peaty soil.



十一

Asplenium *Cracca*

LESSON 103.

leaves, like the last species, to generally form tufts at short distances on the ground, and sometimes scattered.

The fronds, which are often very green, make thick tufts on the ground, and spreading. The rachis is flat. The midrib is smooth, and the sides are covered with small scales. The veins are pinnate, and the leaflets are pinnatifid, and the lobes are acute. The leaves of this plant are smaller than those of the last species. The rachis is usually divided, and the angles of the rachis.

PLATE 11. *Asplenium Cracca*, and *A. Nervosum*, and *A. Trichomanes*, and *A. Sordidum*, and *A. Heterophyllum*, and *A. Pinnatum*, and *A. Reticulatum*, and *A. Loxostachys*, and *A. Ceterach*.

1. *Asplenium Cracca*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.

2. *Asplenium Nervosum*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.

3. *Asplenium Trichomanes*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.

4. *Asplenium Sordidum*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.

5. *Asplenium Heterophyllum*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.

6. *Asplenium Pinnatum*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.

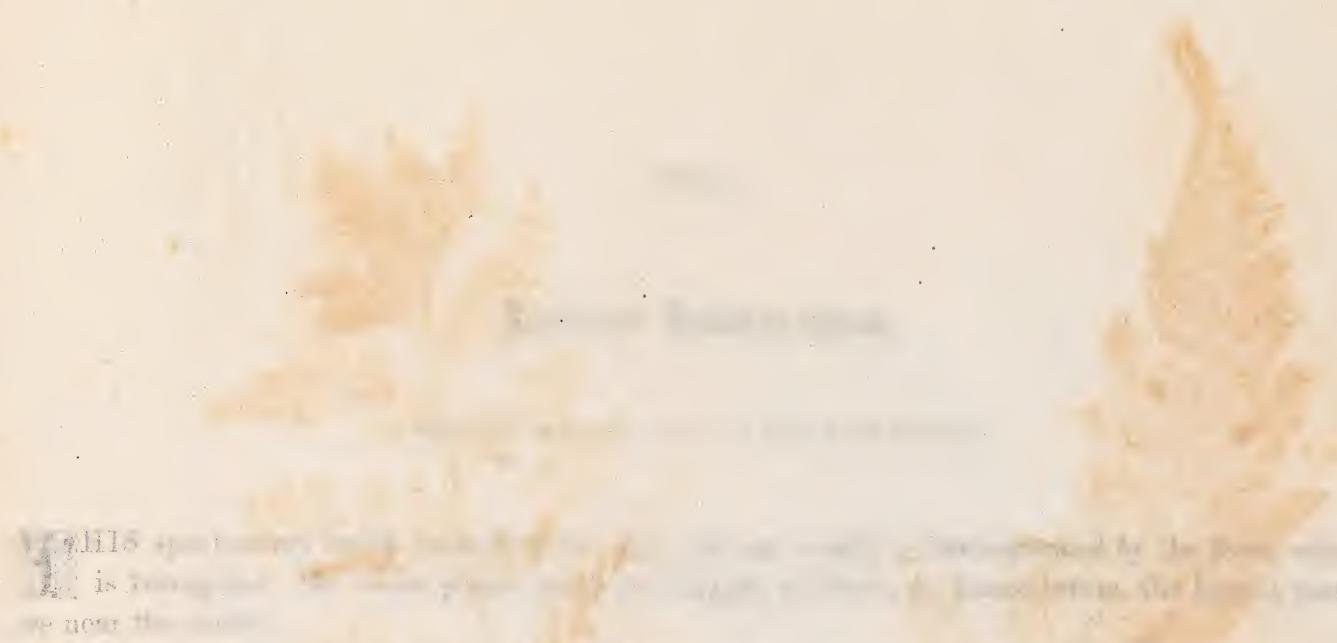
7. *Asplenium Reticulatum*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.

8. *Asplenium Loxostachys*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.

9. *Asplenium Ceterach*.—A small fern, with long, narrow, linear, pointed leaves, which are divided into several segments, and have a few small, round, brownish, scaly points, or tubercles, on the midrib, and on the sides of the rachis, and on the veins.







Fern frond
The rachis is supported by the pinnules which are all pinnatifid below them, the basal pinnae never having pinnules.

The rachis is smooth.

The rachis supporting each pinna is divided into two parts, each part being about 20 mm. in length. The basal part is smooth, and the distal part is covered with small rounded pinnules, these being about 10 mm. long and 5 mm. wide. The rachis is produced in a zig-zag direction, the angle between the two parts of the rachis being about 10°.

The rachis is supported by the pinnules which are all pinnatifid below them, the basal pinnae never having pinnules.

The rachis is smooth, and the distal part is covered with small rounded pinnules. The rachis is produced in a zig-zag direction, the angle between the two parts of the rachis being about 10°.



The rachis is smooth, and the distal part is covered with small rounded pinnules.

It is very difficult to find a fern frond to work.



[XXIII]

Asplenium Adiantum-nigrum.

BLACK MAIDENHAIR SPLEENWORT.

HIIS species very much resembles the last, but can readily be distinguished by the form, which is triangular; the lower pinnæ being the largest, whilst in *A. Lanceolatum*, the largest pinnæ are near the centre.

The fronds appear in the beginning of the summer, and are evergreen.

The roots are strong and fibrous. The rhizome is tufted. The stem is black and shining, and nearly as long as the frond, the whole measuring from four to eighteen inches. The frond is bi-pinnate, the lower pinnules being pinnatifid, the upper ones serrate. The seed is produced in very dense linear clusters, near the mid-rib, and is nearly black when mature, whence the name of the fern.

Habitat.

On walls, rocks, and stony hedge-rows, everywhere.

Varieties.

This fern varies much according to the situation, the lobes being in some cases more narrow and acute, in others more broad and obtuse.

Culture.

It is readily cultivated, and is a handsome ornament to rockwork.

[XXIV]

Asplenium Filix-femina.

L A D Y - F E R N .

HILST one of our most abundant, this is also one of our most elegant ferns.

It is one of the first to appear in the spring, but dies down on the approach of winter. The rhizome is tufted, and often grows to a considerable length. The stem is thick, short, and covered with scales. The frond is from one to three feet in length. It is bi-pinnate, and the pinnae are deeply serrated. The seed is produced in clusters near the mid-rib.

Habitat.

Abundant in hedge-rows and in woods.

Varieties.

This species is subject to great variation, but neither of the varieties seems, according to my observation, sufficiently marked to deserve a distinct name.

Culture.

It is readily cultivated either in or out of doors.





Asplenium flexuoso

LAURENTI

THE HILL of one of our most elevated, thick woods, one of several elongated

ridges in the valley, is often given to a remarkable length. The plants are scattered with some regularity. The rachis is from one to three feet in length. It is bipinnatifid, the pinnules are deeply serrated. The rachis is produced in curves near the middle.

July

Abundant in hedge rows and in woods.

Aug.

This species is subject to great variation, but nothing of the extreme variety, sufficiently marked to deserve a distinct name.

Sept.

It is easily cultivated, and in common use.







Asplenium nidus

Young fronds

The young fronds appear in the spring, and remain green for many years.

The rhizome is tufted. The roots are white, the angles of the head, black, and covered with white scales. The frond is 6 to 12 inches long, and entirely undivided. The leaf is persistent in older clusters on the rock, and disappears in the autumn.

Older fronds

On shady ledges, it may often be seen abundantly on walls, abundant.

Young

There are several very distinct varieties. The fronds are sometimes very much divided at the base, and sometimes striped or variegated.

Older

It is easily cultivated



[XXV]

Scolopendrium Vulgare.

H A R T ' S T O N G U E .

HE appearance of this fern is very different from the generality, the frond being one undivided leaf.

The young fronds appear in the spring, and remain evergreen for many years.

The rhizome is tufted. The stem is one-third the length of the frond, black, and covered with bristly scales. The frond is from six inches to two feet long, and entirely undivided. The seed is produced in oblong clusters on the under surface, and diagonally to the mid-vein.

Habitat.

On shady hedge-rows, in damp ditches, and occasionally on walls, abundant.

Varieties.

There are several very interesting varieties. The fronds are sometimes very much divided at the top, and sometimes crisped at the edges.

Culture.

It is easily cultivated.

[XXVI]

Pteris Aquilina.

C O M M O N B R A K E S .

HIS is the largest as well as commonest of all ferns, and must be familiar to all.

It appears in the spring, and dies down on the approach of winter.

The rhizome is creeping and velvety. The stem is stout and long, and is remarkable for the disposition of the veins, which, when cut across, form a figure like an oak tree. The frond is tri-pinnate, and triangular in shape, and often attains a height of eight feet. The seed is produced in a continuous line round the margins of the lobes.

Habitat.

Common everywhere.

Varieties.

This species seems rarely to vary.

Culture.

It is so common that it will hardly ever be desirable to transplant it, but should it be required for the fernery, it must be removed with great care during winter, when the rhizomes are dormant.





C. (C.) Aculeata (L.) Gray.

THIS is the largest of the common ferns of the United States, and is easily distinguished by its large size, which is often 3 or 4 feet in diameter, and its long, slender rachis, which is about one-third longer than the broadest part of the leaf.

C. (C.) Aculeata

Specimen No. 10.

C. (C.)

This species may be distinguished from the other species of C. (C.) by its long, slender rachis, which is about one-third longer than the broadest part of the leaf.





1860.

Drimia ciliata

"The bulbous plant of the Cape."

It is a bulbous plant with a single, long, narrow, linear, lanceolate leaf.

It appears in flower in October and before the leaves.

The roots are fibrous, the bulbous root is smooth and white, excepting at the apex where there are small, thin, yellowish, wrinkled, and somewhat pointed tubercles. The stem is thin, smooth, slender, 1 and $\frac{1}{2}$ m. high, the flowers are of a light blue—blue to pale lavender. The lower leaves are披针形的 (lanceolate) and pointed, the upper ones are elliptical, and have the seed vascular cluster running diagonally through them.

1860.

On all high mountains in South Africa, the Cape side, is found only in
scrub.

1860.

1860.

1860.

It grows on rock-work or in pebbles upon the gravelly slopes, between two stones, and the soil should be light and sandy.

1860.

1860.

Succowia Capillaris

M. & T. 1860.

It is one of the most abundant of the arborescent, and is generally given by collectors.

It appears in May and remains even through the winter months.

The roots are white, the stem is short, and compact. The stem is very strong and thick, the bark is a bright yellow, and whitening, the surface being covered with short hairs. The stem is covered in various tufts they merge with the stem and covers them.

1860.

Moser Described it from Island, and at a few other places on the south-eastern coast of Africa.

1860.

It has been adopted, but with reservations.

1860.

It should be planted in full sunlight, after periods of rain. It requires abundant moisture, and should be well pruned.



[XXVII]

Cryptogramma Crispa.

ROCK BRAKE, OR PARSLEY FERN.

HIIS fern seems to take the place of the Common Brakes on mountains.
It appears in May or June, and dies before the winter.

The roots are fibrous; the rhizomes are creeping and closely matted together. The stem is long, straw-coloured and smooth. The fronds are of two sorts—fertile and barren. The barren fronds are bi-pinnate, the pinnules being pinnatifid and notched. The fertile fronds are tri-pinnate, and bear the seed in circular clusters between the mid-rib and the margin.

Habitat.

Common on all high mountains, in North Wales; but in South Wales, is found only at Aberdare.

Varieties.

None.

Culture.

If planted on rockwork or in pots, it should be tightly wedged between two stones, and the soil should be light and stony.

[XXVIII]

Adiantum Capillus-Veneris.

MAIDEN HAIR.

HIIS is the most beautiful of the British ferns, and is generally prized by cultivators.
It appears in May, and remains green through the winter if sheltered.

The roots are wiry; the rhizome short and creeping. The stem is long, shining and black. The frond is a brilliant green, triangular and bi-pinnate; the pinnules being fan-shaped with notched margins. The seed is produced in clusters round the margin, which is reflexed and covers them.

Habitat.

Under Dunraven Castle, on Barry Island, and at a few other places on the south-eastern coast of Glamorganshire.

Varieties.

This fern is subject to but little variation.

Culture.

It should be planted in a soil containing some portion of lime. It requires abundant moisture and should be well protected.

[XXIX]

Blechnum Boreale.

HARD FERN.

HIIS is rather a striking fern, and by no means rare.

The fronds, which are of two sorts, fertile and barren, spring up in May; the former die before winter, the latter are evergreen.

The roots are long and wiry; the rhizome is tufted. The stems of the barren fronds are very short, those of the fertile are long and stout. The fronds grow in a whorl, the barren ones being outside and recumbent; the fertile ones within them and erect, and much fewer in number. All the fronds are deeply pinnatifid, so as to be almost pinnate. The seed is produced in two lines, one each side of the mid-rib. The fertile fronds have a peculiarly crisp nature, which renders them difficult to prepare for the herbarium.

Habitat.

Common in damp hedge-rows, and on the side of hills.

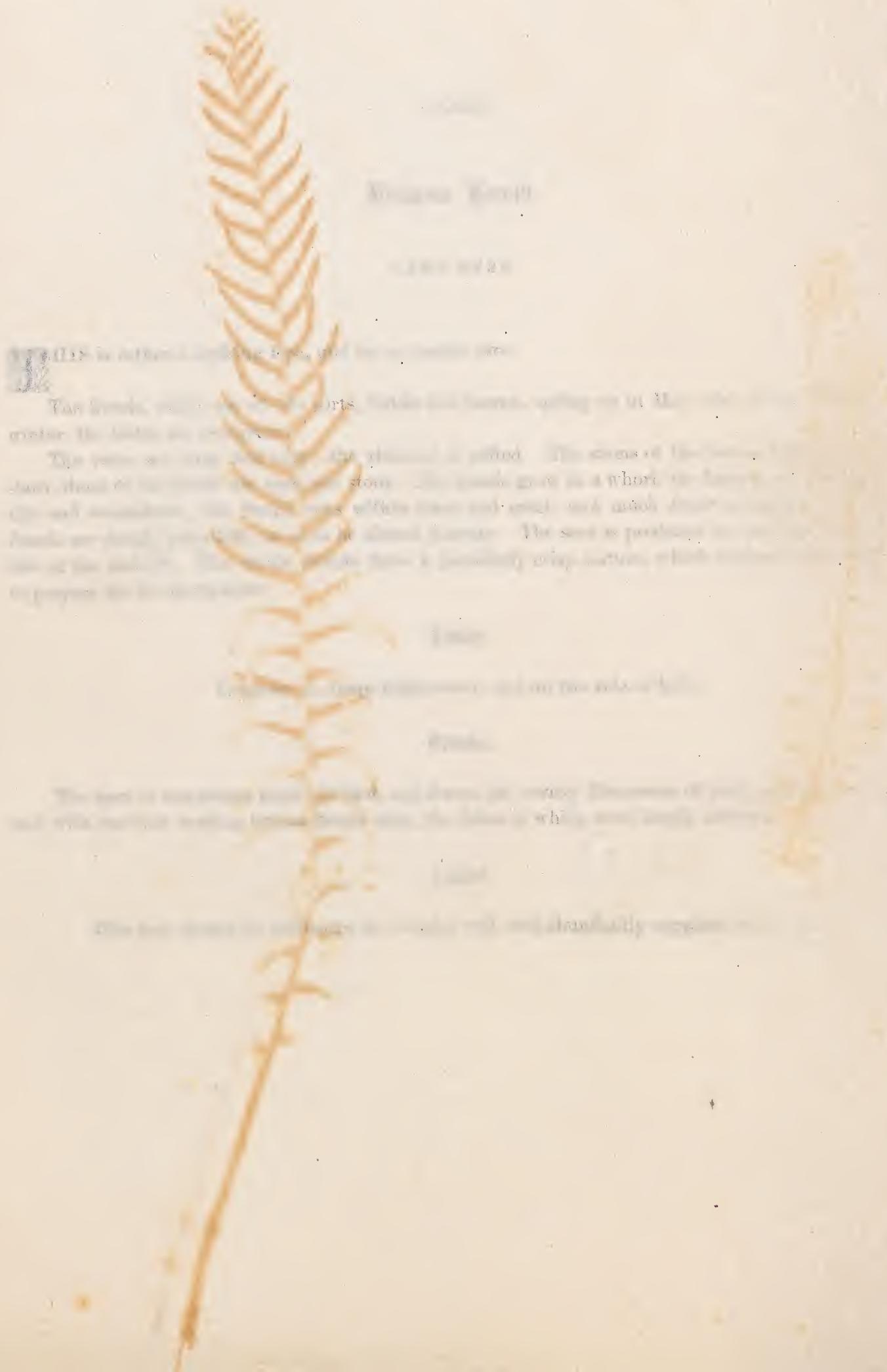
Varieties.

The apex is sometimes much divided, and forms the variety *Ramosum* of some authors. I have met with one root bearing barren fronds only, the lobes of which were deeply notched.

Culture.

This fern should be cultivated in a clayey soil, and abundantly supplied with water.





Dryopteris marginalis

W. M. DAWSON

Fig. 12. A different kind of fern, and from another side.

The ferns, which are now so numerous, have all been collected by Mr. Dawson, the botanist at the Royal Botanic Garden.

The present specimen is a very large plant. The stipe is about 12 inches long, and the blade is about 2 feet wide. It is divided into two main lobes, which are again divided into smaller lobes, and so on. The surface of the blade is covered with many small hairs, which are particularly prominent along the veins. The leaves are deeply lobed, and the lobes are further subdivided.

1 cm.

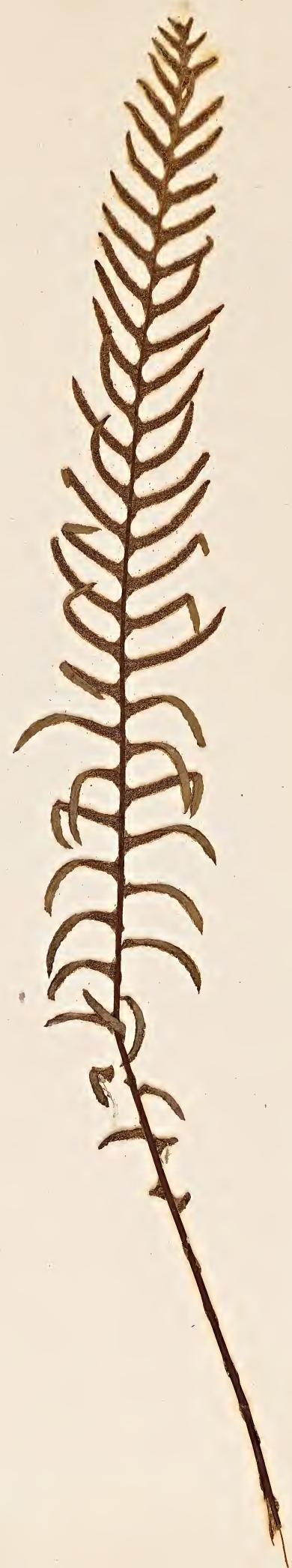
On the left, a large specimen, and on the right, a smaller one.

1 cm.

The last specimen is a smaller one, and shows an entire division of the blade, with several lobes. The surface of the blade is covered with many small hairs, which are particularly prominent along the veins.

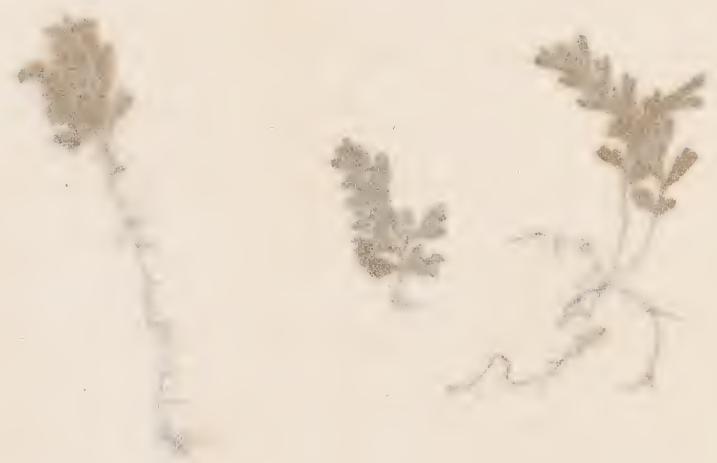
1 cm.

The last specimen is a smaller one, and shows an entire division of the blade,





三



Hymenophyllum Tunbridgense.

T U N B R I D G E F I L M Y F E R N .

HIIS and the following are the smallest British ferns, and are remarkable for their moss-like appearance.

It seems to have no particular time for springing up, as new and withered fronds may always be found mixed together in every mass.

The roots are wiry and adhere strongly to the surface of damp rocks. The rhizomes are creeping and much matted together. The stem is about half as long as the frond, and the whole rarely attains the length of three inches. The frond consists of veins very much branched and covered with a filmy wing, which is serrate. The seed is contained in cup-like involucres, supported on short stalks, between the stem and the branches, which split open at the top when the seed is ripe to allow the capsules to escape.

Habitat.

On damp rocks, generally near streams, in all mountainous districts.

Varieties.

None.

Culture.

This fern is difficult to cultivate, but I have found the following plan to succeed best:—Fill the bottom of a large earthenware saucer (pierced in the bottom) with pieces of broken brick or sand-stone; over this place a layer of Spagnum, and then a thin layer of soil composed of peat and sand in equal proportions, in which the fern must be planted. It must be kept covered with a plate of glass and well supplied with water.

Hymenophyllum Wilsoni.

WILSON'S FILMY FERN.

HIIS species is rather larger than *H. Tunbridgense*, but very much resembles it, so that they are often mistaken for one another; but a close inspection shows them to be distinct.

The same description applies to it in every particular, except that the wings are rarely more than three times divided; that they are drooping while those of *H. Tunbridgense* are erect; and the involucre is pointed and entire at the top, while that of *H. Tunbridgense* is rounded and serrated.

Habitat.

The same as *H. Tunbridgense*, but it is rather rarer.

Varieties.

None.

Culture.

The same as *H. Tunbridgense*.



[XXXII]

Osmunda Regalis.

ROYAL OR FLOWERING FERN.

HIS fern is remarkable for bearing its seed in a sort of crown at the top of the frond, whence, probably, it derives its name.

It appears in May and dies before the winter.

The roots are long and penetrate deep into the ground. The rhizome is tufted and very large, sometimes rising considerably out of the ground. The stem is stout, woody, smooth, and about one-third as long as the frond. The frond attains the length of five to seven feet. It is bi-pinnate, the pinnules being generally entire, sometimes serrated. The seed is produced in circular clusters on the changed pinnules of the upper part of the frond. Instances may often be found where a pinnule is only partly changed, the remainder being leafy.

Habitat.

Common in swampy places, and on wet hedge-rows.

Varieties.

None.

Culture.

It should be grown in peat, and be plentifully supplied with water, which should not be drained off.



Osmunda cinnamomea

ROYAL OR FLAX FERN.

It is a plant of singular beauty, bearing its soft green leaf of remarkable size, on a slender stem, which is clothed with long, narrow, pointed leaves before the whorl of fronds is produced. The fronds are deeply lobed, and the lobes are divided by numerous small veins, which give them a delicate, lace-like appearance. The plant is very hardy, and will grow in almost any soil, but prefers a moist, shaded situation.

The Royal Fern is a native of Europe, and is found in the woodlands of the Alps, the Pyrenees, and the Apennines. It is also found in the mountains of Central America, and in the Andes of South America. It is a very common plant in the British Isles, and is often cultivated in gardens.

FRONDS.

It should be grown in a deep, well-drained soil, and should be watered frequently during the summer months.







Scirpus is a genus of plants which are easily distinguished from the *Cyperaceae* by their long, narrow, flat leaves, which are almost linear, and by the arrangement of the spikelets in whorls at the ends of the branches.

Scirpus.

This genus contains many species, but I have not seen enough to determine its limits.

Scirpus.

This species has been described as a separate species, under the name of *S. latifolius*, by Linnaeus; it is however, now considered as a specific species, under the name of *S. lacustris*.

Scirpus.

The ground must be necessary to remove a large soil, in which it is necessary to plumb with water, which should be slowly drained off.

Scirpus.

Scirpus lacustris.

Mossy Scirpus.

This species of mossy land, and in many respects resembles the last species, but is more robust, and the culm more robust than the latter.

The culm is tall, the culm a more pointed. The sheath is much narrower than the last, and the ligule is shorter. The head is from two to three times larger, and more compact. The bracts with provide the plant being half-a-metre high, and covered with regular capsules, which are yellowish brown, and

Scirpus.

more slender than the last species, but is rather broad. I am only acquainted with this species in the neighbourhood of North.

Scirpus.

This species is described as *S. lacustris*, but I have not heard of its being found in Wales.

Scirpus.

This species should be collected in the more common at the base.

Ophioglossum Vulgatum.

ADDER'S TONGUE.

AT first sight, this by no means resembles a fern, but is soon distinguished by its seed.

It appears in the spring, and dies in the course of the summer.

The roots are very long and penetrating. The rhizome hardly exists, as the stem almost springs from the roots. The stem is principally underground, and longer than the frond. The frond consists of a single leaf, two or three inches long, and ovate. From within the folds of this leaf, rises a stalk, longer than the leaf, and bearing on its top a spike of a double row of capsules.

Habitat.

In swampy fields abundant, in some localities; but I have met with it in only two, namely, at Glyn Clydach and Pen-y-Graig, near Neath, Glamorganshire.

Varieties.

A dwarf variety has been described as a separate species, under the name of *O. Lusitanicum*; but I have not heard of its occurrence in Wales.

Culture.

As the roots extend to a considerable depth, it is necessary to remove a large sod, in which it must be allowed to remain, supplying it plentifully with water, which should be slowly drained off.

Botrychium Lunaria.

MOONWORT.

BHIS is another frequenter of meadow land, and in many respects resembles the last species.

It appears about April, and dies down during the summer.

The roots are succulent and brittle, the rhizome a mere point. The stem is mostly underground and about the same length as the frond. The frond is from two to four inches long, and consists of one fertile and one barren leaf. The barren leaf is pinnate, the pinnae being half-moon shaped. The fertile leaf is bi-pinnate, and covered with globular capsules, which are yellowish brown when ripe.

Habitat.

It is found in dryer situations than the last species, but is rather local. I am only acquainted with a few of its localities in the neighbourhood of Neath.

Varieties.

A variety is described as *B. Rutaceum*, but I have not heard of its being found in Wales.

Culture.

This fern should be cultivated in the same manner as the last.

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